

The Role of Artificial Intelligence (AI) in Culinary Tourism

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Abstract

Technological advancement has increasingly influenced culinary tourism, with the use of artificial intelligence (AI) to influence tourist experience proposition. The role of AI-driven experiences as a mediator between culinary motivation and tourist satisfaction and between culinary involvement and tourists' behavioural intentions is investigated in this study. The data collected from 375 culinary tourists who visited various culinary destinations in Kerala, India were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) using Smart PLS. The study investigates how the applications of AI in the tourism sector, such as personalised recommendations and gastronomic guides which are intelligent and smart, have an impact on tourists' motivations and sense of engagement with culinary destinations in a way that is more satisfactory to the tourists. Further, the study intends to elaborate on how AI makes it easier to get customers emotionally engaged, fostering stronger behavioural intentions, such as revisit intention and word-of-mouth promotion. This research contributes to the emerging study on AI-driven tourism experiences by unveiling the effect of AI on these relationships and providing important implications for tourism and hospitality industry stakeholders. Destination marketers, restaurant owners, and tourism planners can use these results to strategically incorporate AI to add value to culinary tourism offerings. To the end, the study reiterates that AI has a great role in driving the advancement of tourism today and has become an important driving force, which can deliver better visitor engagement and satisfaction to the tourism sector, especially the culinary sector.

Keywords: AI-Driven Experiences, Behavioural Intention, Culinary Involvement, Culinary Motivation, Tourist Satisfaction.

Introduction

Food is not simply a basic necessity but a cultural artefact that encodes the meaning of identity, heritage and belonging. Eating practices and culinary traditions are considered by scholars from food studies and cultural anthropology as characteristic markers of cultural continuity and social distinction (1). Meals and food preparation activities are performative acts that allow communities to narrate their stories, entrench collectivises and recreate conditions for the transfer of cultural knowledge (2). As such, food has become an important arena for understanding the positioning of individuals and groups in the context of a larger socio-cultural landscape. From a tourism management literature perspective, food has recently been seen as a cultural and experiential commodity used in terms of forming destination image, contributing to visitor satisfaction and repeat visitation (3). Beyond consumption, culinary tourism is an encounter with culture in which travellers seek authenticity,

novelty and embodied experiences through gastronomy (4). The incorporation of food into the offering of tourism thus positions gastronomy as a cultural practice, not only leisure, but also as a strategic tool for the cultural valorisation and economic development. Culinary tourism has now become an influential sector in the global tourism sector, which welcomes travellers with unique and genuine gastronomic touches (5). Due to the more frequent use and the presence of tech in the tourism realm, artificial intelligence (AI) has become a vital component in at least increasing the visitor's involvement, streamlining services and providing customer-oriented experiences (6). Food and culinary destinations are being transformed by AI applications, including smart recommendation systems, virtual culinary assistants, and immersive augmented reality dining experiences (7). A recent series of advancements has driven researchers to delve into the psychological and behavioural aspects of AI-

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driven experiences, including motivation, involvement, and satisfaction (8). However, empirical studies on how AI mediates tourists' perceptions and behaviours regarding the culinary tourism domain are scarce. Gaps in the research are then addressed by this study, focusing on whether the relationship between culinary motivation and tourist satisfaction, as well as between culinary involvement and tourists' behavioural intentions, can be mediated by AI-driven experiences. This research analyses the impact of AI-driven digital food experiences, personalized recommendations and virtual culinary assistants on culinary engagement and its impact on post-visitation behaviour using Partial Least Squares Structural Equation Modelling (PLS SEM) using the gathered data of 375 tourists who visited various culinary destinations in Kerala, India. Therefore, stakeholders in the tourism and hospitality industry need to understand these dynamics to optimise AI adoption and improve service delivery (9). Therefore, AI integration gives culinary tourism businesses a chance to create greater engagement, increase visitor satisfaction, and achieve long-term loyalty. This study represents one of the pieces of such a growing body of literature regarding AI in tourism and offers practical implications for destination marketers, restaurant managers, and policymakers leveraging technology for sustainable tourism development. The concept of smart tourism has become a buzzword which involves the convergence of advanced technology with travel experience thus bringing smartness into travel experience (10). The interaction of artificial intelligence (AI) and culinary tourism has begun to attract more attention from scholars with their research on how the AI-driven experiences affect tourists' behaviour, satisfaction and engagement. Traditionally, AI technologies including machine learning (ML) based recommendation system; augmented reality (AR) dining experience and chatbot assisted services have changed the traditional culinary tourism by personalization offerings and improving the customer interactions (8). According to studies, the digital innovations are important in driving culinary motivation which is a key motivator to food tourism and AI can convene unique gastronomic experiences which will meet individuals' preferences (11). Additionally, the involvement of tourists in culinary

experiences includes the use of AI tools such as AI-based virtual tours, and interactive cooking demonstrations which result in tourists' behavioural intentions towards them (12). Despite preceding studies of the contribution of motivation and involvement to the formation of tourist satisfaction, there are few investigations on the role of AI as an intervening variable between these latter variables and the satisfaction of the tourists, which represents an important gap in the literature (9). To fill this gap, this study will assess how AI driven experiences moderate culinary motivation and satisfaction relationship and also culinary involvement and behavioural intentions relationship. This review synthesizes literature to create a foundation for comprehending the use of AI in culinary tourism and adds value to the body of technology in tourism experience literature.

H1: Culinary Motivation (CMN) positively influences Tourists' Satisfaction (TSA)

Tourist satisfaction is determined by culinary motivation since food experiences are often a driving force in travellers' decisions to travel and appreciation of a trip. Increasingly, tourists are drawn to desire for novelty and authenticity of culinary traditions, which further satisfies tourists' satisfaction of the destination (13). Cultural curiosity, sensory pleasure, and social interactions are the motivations to experience local cuisine, which enhance travel experience (14). Experiential studies have found that those touristic actions interested in gastronomic experiences tend to be more satisfied because gastronomic consumption can create emotional and memory learnings (15). Culinary tourism promotes deeper connexions to a destination, generating positive evaluations and the greater chances of revisit functions (16,13). Based on the factors which describe tourists' attitudes towards culinary tourism, the following hypotheses were developed: culinary motivation positively affects tourist satisfaction because motivated tourists tend to do meaningful food related activities which ultimately contribute to the satisfaction of the overall travel experience.

H2: Culinary Motivation (CMN) Positively Influences AI-Driven Experiences (AIE)

The motivation behind cuisine has a tremendous influence on AI driven experiences in tourism by determining how travellers utilise technological augmented dining experiences. Thus, while tourists look for one of a kind and immersive

culinary experience, AI technologies, namely virtual restaurant recommendations, smart dining assistants and augmented reality (AR) food experience help them to explore, understand and enjoy local gastronomy (17). The AI tools are customised for tourists' culinary motivations by offering them personalised dining suggestions, interpreting history and food origins through interactive storytelling, and generating AI adapted recipes for tourists (6). The research found that the strong culinary motivations among travellers mean that to engage with digital innovations that facilitate food discovery, authenticity and convenience is relatively likely (18). In addition, AI applications in culinary tourism eliminate the language barriers for tourists, they are able to connect to real time dietary information, and be able to communicate apt food that fits with their tastes and preferences (9). Spatially, the growing role of AI in food tourism motivates food tourists to search for and discover food beyond regional boundaries and is thus a potential key for revitalization in regional economies of food and tourism, which are crucial for attraction and retention of tourists.

H3: AI-Driven Experiences (AIE) positively influence Tourists' Satisfaction (TSA)

AI driven experiences contribute to the satisfaction of tourist by the provision of the personalised, seamless, and immersive experience in the culinary tourism industry. Smart recommendation systems, augmented reality (AR) menus, and chatbot serving as the dining services make tourists enjoy the advanced AI applications greatly, which provides them tailored culinary experiences that match their personal preferences (19). With AI, waiting times are reduced; one can avail multilingual support, and can have real time updates on food choices and availability of restaurant, hence making it more satisfying and convenient (6). Furthermore, AI personalization boosts the feeling of exclusivity and interaction with tourists who think their specific tastes and dietary demands are being met by intelligent food service automation (20). According to studies, digital enhancements that are instigated by AI are a key driver in emotional engagement, and customer delight which have a positive influence on a customer's satisfaction level and propensity to create positive word-of-mouth recommendations (10). Since culinary tourism has become

increasingly dependent on the use of AI to optimise culinary tourist experiences, the above hypothesis is formulated that AI tour experiences have a positive impact on tourist satisfaction by ensuring convenience, personalization, and the standard of service.

H4: Culinary Involvement (CIT) positively influences Tourists' Behavioural Intention (TBI)

Involvement with the destination's food has a significant effect on tourists' behavioural intention, as those involved with food have stronger intention to revisit, recommend and share the experience. On the other hand, tourists who are engaged in culinary activities like food festivals, cooking classes and local dining experiences bond themselves more emotionally with the destination which provokes stronger intention in re visiting and spreading good words about the destination (11). The research shows that food experiences create positive impact on destination attractiveness; tourists who are largely involved in food activities develop stronger loyalty and repeat visit intention (21). Furthermore, culinary involvement also helps increase experiential value by creating memorable and meaningful experience relating to local cuisine, traditional cooking process, food narration, etc. which will contribute to future behavioural intention (22). The growing significance that gastronomy is taking in tourism makes the destinations promoting immersive culinary experiences able to influence tourists' behavioural intentions, further reinforcing the relationship between involvement and tourists' future travel decisions (23). Based on this, a hypothesis is made that culinary involvement is positively related to tourists' behavioural intention, which is associated with involvement and contributes to tourists' satisfaction and emotional attachment to the destination.

H5: AI-Driven Experiences (AIE) positively influence Tourists' Behavioural Intention (TBI)

Tourists' behavioural intentions have been greatly influenced in culinary tourism by the AI driven experiences that increase the engagement, personalization and convenience in the experience. Applications of AI in tourism, e.g., virtual food tours, AI enhanced restaurant recommender, and AI based interactive culinary leisure experiences, allow to create an immersive and customised experience to strengthen tourists' intention to

revisit and recommendation of a destination (24). The application of AI driven technologies (chatbots, AR, smart recommendation systems) leads to increase in user staying on the website, enhances user satisfaction and engagement and consequently strengthens their behavioural commitment (25). In addition, AI provides live information on dining options, creates personalised culinary itineraries, and AI can help in predictive analytics of food choices thus increasing a possibility of repeat visit (10). With AI increasingly changing the tourism landscape on how to curate and deliver such memorable experience, tourists' behavioural intention to exhibit brand loyalty and positive word-of-mouth are influenced accordingly (26). As such, it is hypothesised that the AI driven experiences contribute to boosting the tourists' behavioural intentions under the rubric of culinary tourism by making them more satisfied and participating on a more engaged basis with the said tourism.

H6: Culinary Involvement (CIT) positively influences AI-Driven Experiences (AIE)

Involvement of culinary on AI driven experiences is important in promoting AI driven engagement of tourists with technology enabled culinary activities. Those tourists who exhibit a higher involvement in culinary experiences tend to apply an AI driven personalised and interactive solution like AI based food recommendations, VR cooking classes, and smart dining assistants (24). Deep immersion of culinary tourism through AI technologies also allows for tailored experiences that adhere to tourists' given preferences and expectations therefore making the engagements richer (24). According to research, the more the tourists engage in culinary activities, the higher their interest in AI driven innovations for convenience and to customise and offer novel experiences (25). Besides knowledge sharing, interactive storytelling and dining experience in augmented reality (AR) are also enabled by AI driven platforms which further adds value to culinary tourism experiences (26). Consequently, it was hypothesised that culinary involvement affects AI driven experience positively by promoting higher level of engagement and the level of satisfaction with technology enhanced culinary tourism.

H7: AI-Driven Experiences (AIE) mediate the relationship between Culinary Motivation (CMN) and Tourists' Satisfaction (TSA)

The AI driven experiences are an important mediator to bridge the gap between culinary motivation and tourist satisfaction through an increase in tourists' engagement, personalization and convenience towards culinary tourism. Tourists use AI technologies such as intelligent recommendation systems, virtual reality (VR) food tours, and smart dining assistants, because they are looking for culinary motivation or looking to experience food-related experiences (27). These motivations are then enhanced with AI driven experiences on foods which include customized culinary advises, translating languages in real time, conducting interactive cooking demonstrations and hence making food tourism more immersive and enjoyable (24). Thus, tourists who have interacted with the AI culinary experiences indicate higher satisfaction due to their integrated experiences with technology in gastronomy (25). In addition, the aim of AI driven experiences to increase the accessibility of various cuisines, make easier decision making and support for deeper cultural appreciation make a positive contribution to increased levels of tourist satisfaction (28). Therefore, it is hypothesised that AI driven experiences could mediate the relationship between culinary motivation and tourist satisfaction by bridging the effect of culinary motivations on tourist satisfaction.

H8: AI-Driven Experiences (AIE) mediate the relationship between Culinary Involvement (CIT) and Tourists' Behavioural Intention (TBI)

The role of AI-driven experiences as a mediator that influence the tourists' behavioural intention by allowing higher levels of culinary involvement and guests' engagement, interaction and decision processing in culinary tourism. Involvement in food as a tourist refers to extent to which they participate actively in food experiences like local dining, cooking classes or food festivals (11). This involvement is amplified through the use of AI driven technologies such as AR menus, AI generated food recommendations, immersive and personalized technology for interaction with the gastronomic storytelling (8). Moreover, through these enhanced AI applied interactions, tourists's tendency of revisiting destination, suggesting for the experiences and making future food related

travel decision is increased (29). Additionally, AI promotes real time personalization and access to culinary experiences in a more informed and satisfying way, providing to tourists a reason to maintain their behavioural intentions (28). Technology advancements happen; however, through the advancement in AI technology, hypothesized AI driven experiences facilitate the contribution of the relationship between culinary involvement and tourist's behavioural intention by increasing the depth and quality of engagement and encourage positive future behaviour.

The construct, namely the AI-Driven Experience Mediation Model in Culinary Tourism consists of key constructs i.e. Culinary Motivation (CMN), Culinary Involvement (CIT), AI-driven Experiences (AIE), Tourist Satisfaction (TSA) and Tourists' Behavioural Intention (TBI) that aim to determine the connections of motivation and involvement with AI applications and tourist responses. This framework (Figure 1) is based on previous researches on experience driven tourism and AI integration within service enhancement (8). The culinary motivation which is the tourists' inherent and extrinsic need for trying out local gastronomy directly boosts tourist satisfaction and encourages AI driven experiences through formations with AI powered platforms like smart recommendations, virtual reality food previews and chatbot driven culinary guides (29). In this way, the AI driven experiences enhance the satisfaction of the tourists

as they offer them additional personalized, interactive yet data driven experiences, which aid them in making better informed culinary engagement (28). Likewise, tourists' culinary involvement, which means food related tourism activities' depth in participation, directly affects tourists' behavioural intention as well as enriching AI driven experiences by means of digital interactions with AI including AI suggestions in dining and food storytelling in augmented reality augmentation (11).

The role of AI driven experiences in mediating the relationship between culinary motivation and satisfaction towards a tourist and culinary involvement and tourist behaviour intention is also highlighted by the framework. As such, AI serves as an intermediary so that motivation and involvement of tourists become enhanced interactions in digital form which end up in greater satisfaction and stronger behavioural intentions (30). This model functions as a structured tool to study AI in culinary tourism and offers helpful ideas for tourism practitioner on how to deploy AI technologies aimed at enhancing visitors' experiences and appeal of the destination. AI driven solutions would aid culinary tourism to become immersive, customized and more appealing to the modern travellers, therefore creating happiness of the individual as well as heightening competitive industry.

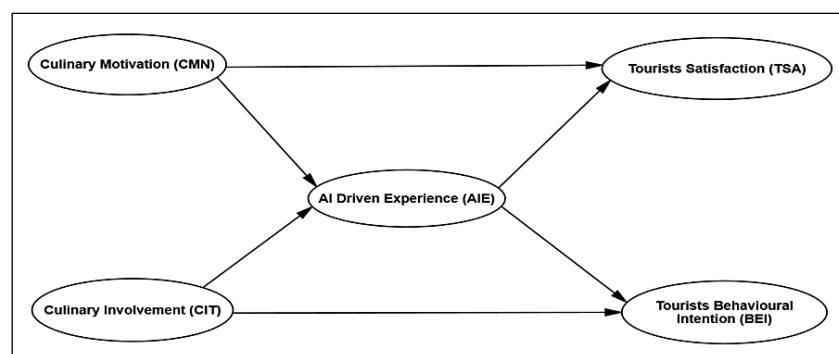


Figure 1: Conceptual Framework on AI-Driven Experience Mediation Model in Culinary Tourism

Although there is already a growing body of literature in the domain of applying AI in tourism, the research of AI based experience in culinary tourism is still lagging. Previous studies mostly look into how AI helps tourists in general tourism experiences (8) or personalised recommendation in hospitality (28) but not into how, AI mediates the relationship among tourists' culinary

motivation, involvement, and satisfaction. Although the role of culinary motivation on food tourism engagement (11) and the role of technological advancements toward enhancing the tourist experience is well addressed (24), the particular function of AI on tourists' behavioural intention is not yet explored. Furthermore, while more AI tools such as virtual reality menus and AI

powered food guide are used for tourists' AI driven experiences, there are only limited studies on how AI drive experience influence tourists' satisfaction in culinary domain (29). Despite the prevalence of AI applications being used in the tourism sector to enhance customer experience, there exists a gap to examine how AI contributes positively to tourist satisfaction and behavioural intentions under the culinary motivation with involvement. Intended as such, this study focuses on the mediating role of AI driven culinary experience between culinary motivation and tourist satisfaction and between culinary involvement and tourists' behavioural intention to offer tourism stakeholders some insights to how AI should be integrated into the culinary tourism.

Because there has been limited exploration of AI driven culinary tourism, the following are key questions that can help bridge this gap. first, what is the role of AI driven experience on the link between culinary motivation and tourist satisfaction. Despite the fact that studies have demonstrated that culinary motivation increases food tourism involvement (11), the mediating role of AI driven experience becomes yet to be investigated. Second, examine how culinary involvement relates with tourists' behavioural intentions, and to what extent is AI-driven experience moderating this relationship? While prior tourism experience research has shown the importance of technological advancements on tourists (24), studies on culinary involvement and behavioural intention, particularly on how it is affected by specific technological advancements, has not been previously studied. Thirdly, how do AI enabled experiences influence direct satisfaction and intention of behaviour of tourists in culinary tourism? Although virtual reality menus and smart food recommendations of AI-powered tools are increasingly integrated into restaurants (29) and existing studies have presented some results about their effectiveness in increasing satisfaction and intention, research in support for their effectiveness is still limited. These questions will contribute to understanding how the AI driven experiences can boost the culinary tourism, and how tourism stakeholders can better employ the AI solutions for attracting tourists and making them comfortable and satisfied.

As culinary tourism gains importance and AI driven experiences become part of a restaurant's

DNA, there is yet a gap in understanding of their interplay with relation to tourist's behaviour and satisfaction. Previous studies have demonstrated culinary motivation and involvement as factors to boost the quality of tourist experiences (11, 31), although the mediation role of AI experience in this area is rarely addressed. Another, AI technologies like personalised recommendations and augmented reality menus have previously been recognised as ways to improve tourists' satisfaction (29), however, have hardly been studied thoroughly to analyse their influence on tourists' behaviour intention in culinary tourism. Moreover, the effect of AI driven experiences on the relationships between culinary motivation involvement and related tourism outcomes like satisfaction and revisit intention has not been fully explored (30). Therefore, addressing this research gap is important in developing a theoretical model that explains how AI influences culinary tourism, eventually prompting industry stakeholders to utilise AI in enhancing tourist engagement and ensuring tourist satisfaction. The objectives of the study are to examine the mediating role of AI-driven experiences in the relationship between culinary motivation and tourist satisfaction and to analyse how AI-driven experiences mediate the relationship between culinary involvement and tourists' behavioural intention.

Methodology

This research takes the approach of quantitative research, to determine how the role of the AI-driven experiences in culinary tourism mediates the relationships between culinary motivation, involvement, satisfaction and behavioural intention of the tourists. The type of research design used is cross sectional research design to capture tourist's perceptions and experiences with AI driven culinary tourism during a particular period. This is a perfect approach to identify behavioural patterns and motivation of people with regards to AI enabled dining experience. Existing literature and theories in tourism motivation, involvement, AI technology and consumer behaviour are referred for developing the research framework. A structured questionnaire data collection is applied in this paper with validated scales for measurement of key constructs such as motivation, involvement, AI

driven experiences, satisfaction, and behavioural intention.

This study depends on ensuring that sample size calculation is performed. In addition, since Partial Least Squares-Structural Equation Modelling (PLS-SEM) is used, an adequate sample size is required to achieve sufficient statistical power. Based on the 10-times rule method, minimum sample size is recommended to be at least 10 times of the longest number of structural paths to any one of the latent constructs. From this, we can estimate that one can only obtain a minimum of 200 to 300 respondents. G Power software is also used to enhance the statistical precision taking into consideration a medium effect size of 0.15, significance level of 5% and a statistical power of 80%. Thus, on the basis of this computation, one can argue that at least 160 to 200 respondents are needed. A total of 375 respondents are targeted to strengthen the study's robustness. The use of this sample size guarantees that model is reliable for bootstrapping procedures and mediation analysis as well as for greater generalizability of the findings. Another reason why the larger sample size is desirable is that it helps in reducing statistical errors and reduces the fears of non-response bias.

A total of 375 participants was selected through the purposive sampling technique in which the participants have direct experience in AI driven culinary tourism making sure that different types of tourists have representation such as food enthusiast, casual diner, tech savvy travellers. Tourists who have interacted with AI culinary services for food ordering either on demand, providing personalised menus, robotized food

service or AI-inspired food recommendations, among others, meet the selection criteria. Data collection is a hybrid approach made of offline and online surveys. The surveys are conducted both online and offline at an AI enhanced restaurant, food festivals and tourist destinations.

Structured equation modelling (SEM) technique is used for analysing direct, indirect and mediating effects among the variables. The chosen software is Smart PLS software because it allows the handling of complex models and provides strong statistical insights. Finally, this study employs Partial Least Squares-Structural Equation Modelling (PLS-SEM) to confirm the reliability of hypothesis testing and validation of the conceptual proposed framework.

Results and Discussion

In this study, Partial Least Squares-Structural Equation Modelling (PLS-SEM) with SmartPLS software is utilised to examine the relationships between the culinary motivation, culinary involvement, AI-driven experiences, the satisfaction of tourists, the behavioural intention. The measurement model is assessed in terms of reliability and validity, and the structural model is tested with hypotheses. In order to make the analysis robust to statistical inferencing, bootstrapping with 5000 resamples is applied by using the bias corrected percentile method. This result also aids in understanding the intervening role that AI driven experiences could play in shaping tourists' behaviour in the realm of culinary tourism, which is conceived as the technological advancement sphere.

Table1: Demographic Profile of Tourists

Age	No. of Tourists	Percent
Below 30	35	9.3
30 -45	88	23.5
45 -60	166	44.3
Above 60	86	22.9
Total	375	100.0
Gender	No. of Tourists	Percent
Male	224	59.7
Female	151	40.3
Total	375	100.0
Education Level	No. of Tourists	Percent
High School or Below	35	9.3
Diploma/Certification	107	28.5
Undergraduate Degree	127	33.9
Postgraduate Degree	45	12.0

Professional Degree	61	16.3
Total	375	100.0
Occupation	No. of Tourists	Percent
Retired	25	6.7
Self-employed	116	30.9
Private Sector Employee	140	37.3
Public Sector Employee	53	14.1
Professionals	41	10.9
Total	375	100.0
Monthly Income	No. of Tourists	Percent
Below 30,000	39	10.4
30,000 - 45,000	141	37.6
45,000 – 60,000	120	32.0
60,000 and above	75	20.0
Total	375	100.0
AI-based food recommendation apps	No. of Tourists	Percent
Indians from Outside the Kerala	37	9.9
Google Lens	105	28.0
Trip Advisor	124	33.1
Swiggy	43	11.5
AI-driven chatbot assistants (e.g., ChatGPT, Google Bard for food recommendations)	66	17.6
Total	375	100.0
Type of Cuisine Most Interested	No. of Tourists	Percent
Local/Traditional Cuisine	27	7.2
International Cuisine	113	30.1
Street Food	134	35.7
Fine Dining	55	14.7
Fusion/Experimental Cuisine	46	12.3
Total	375	100.0

Table 1 presents the demographic profile of the surveyed tourists, comprising 375 respondents categorized by age, gender, education level, occupation, monthly income, AI-based food recommendation app usage, and cuisine preferences. The majority fall within the 45-60 age group (44.3%), followed by 30-45 years (23.5%), while those below 30 years (9.3%) and above 60 years (22.9%) form smaller segments. Gender distribution shows a higher proportion of males (59.7%) compared to females (40.3%). In terms of education, most respondents hold an undergraduate degree (33.9%) or a diploma/certification (28.5%), while only 9.3% have completed high school or below. Regarding occupation, private sector employees (37.3%) and self-employed individuals (30.9%) constitute the largest groups, whereas retirees (6.7%) represent the smallest segment. Monthly income data reveals that most tourists earn between INR 30,000-INR 45,000 (37.6%) and INR 45,000-INR 60,000

(32.0%), while 10.4% earn below INR 30,000 and 20% earn above INR 60,000. Among AI-based food recommendation apps, TripAdvisor (33.1%) is the most commonly used, followed by Google Lens (28.0%), while AI-driven chatbot assistants (17.6%) and Swiggy (11.5%) have relatively lower adoption. Additionally, 9.9% of tourists are Indians from outside Kerala, indicating a diverse participant base. In terms of culinary preferences, street food (35.7%) is the most popular, followed by international cuisine (30.1%), while fine dining (14.7%), fusion/experimental cuisine (12.3%), and local/traditional cuisine (7.2%) attract fewer enthusiasts. This data provides key insights into tourists' demographic characteristics, economic background, AI engagement in culinary experiences, and dining preferences.

Model Fit

The results of the Partial Least Squares Structural Equation Modelling (PLS-SEM) using the Smart PLS software tool were utilised through the

assessment of the overall model fit and explanatory power of the model as the AI-Driven Experience Mediation Model in Culinary Tourism (Figure 2). For this reason, PLS-SEM was selected as the most appropriate method since it can be applied to complex mediation models with latent variables. In addition, the Standardized Root Mean Square Residual (SRMR), Normed Fit Index (NFI), and R-Squared are key indicators of model fit

where their values were within acceptable boundaries, hence assuring the reliability and predictive accuracy of the model. A well fit model in the results has been demonstrated and the viability of AI enabled experiences as a mediating variable in the relationship between culinary motivation, culinary involvement, tourists' satisfaction and behavioural intention has been confirmed.

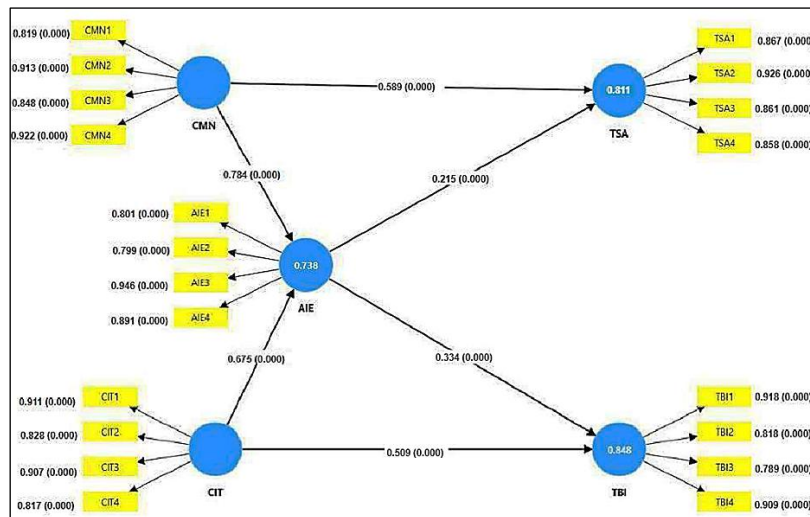


Figure 2: AI-Driven Experience Mediation Model in Culinary Tourism

Table 2: Model Fit Measures related to AI-Driven Experience Mediation Model in Culinary Tourism

	Saturated model	Estimated model
SRMR (Standardized Root Mean Square Residual)	0.047	0.047
d_ULS (Unweighted Least Squares Discrepancy)	0.215	0.215
d_G (Geodesic Discrepancy)	0.301	0.301
Chi-square	158.561	158.561
NFI (Normed Fit Index)	0.947	0.947

The summary model fit measured for the AI-Driven Experience Mediation Model in Culinary Tourism is stated in Table 2 with the saturated and estimated models. With the Standardised Root Mean Square Residual (SRMR) value of 0.047, the model fit is good, below the typical threshold of 0.08. These values of d_ULS and d_G of 0.215 and 0.301, respectively, remain the same for the observed and for the estimated covariance matrix, indicating

very slight differences between observed and estimated covariance matrices. Furthermore, the model adequacy is supported by Chi-square value of 158.561 and a strong fit is indicated by Normed Fit Index (NFI) of 0.947 close to 1. These fit indices support the notion that the model well represents the links among AI driven experiences, culinary motivation, culinary involvement, tourist satisfaction and tourist behavioural intention.

Table 3: Construct Reliability and Validity of the AI-Driven Experience Mediation Model in Culinary Tourism

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
AIE	0.768	0.810	0.849	0.589
CIT	0.761	0.791	0.848	0.585
CMN	0.864	0.881	0.909	0.715

TBI	0.864	0.875	0.909	0.715
TSA	0.872	0.883	0.915	0.653

The construct reliability and validity measures for the AI Driven Experience Mediation Model in Culinary Tourism are presented in Table 3. All constructs present Cronbach's alpha values in line with acceptable to high internal consistency (0.761 – 0.872). Reliability (rho_a and rho_c) for composite constructs exceeds minimum requirement of 0.7 and is considered as strong. The values for the Average Variance Extracted (AVE) of all constructs were above 0.50, with the least being

0.585 for Culinary Involvement in Tourism (CIT) and highest at 0.715 for the Culinary Motivation (CMN) and Tourist Behavioural Intention (TBI), thus possessing adequate convergent validity. Thus, these results suggest reliability and validity of constructs in the model, and confidence in that the AI driven experience, culinary motivation, culinary involvement, tourist satisfaction, and behavioural intention have been properly reflected in the study.

Table 4: Discriminant Validity Fornell Larker Criterion related to AI-Driven Experience Mediation Model in Culinary Tourism

	AIE	CIT	CMN	TBI	TSA
AIE	0.767				
CIT	0.514	0.765			
CMN	0.547	0.518	0.846		
TBI	0.618	0.601	0.624	0.846	
TSA	0.615	0.579	0.617	0.557	0.808

The Fornell-Larcker criterion for the validity of the AI-Driven Experience Mediation Model in Culinary Tourism is presented in the form of Table 4. The square root of the Average Variance Extracted (AVE) of each construct can be shown in diagonal, and the correlations of constructs in off diagonal values. Having the diagonal values greater than the related off-diagonal values in every column will

serve to prove discriminant validity. This test is confirmed in that, AIE, CIT, CMN, TBI and TSA satisfy the criterion as the square root of their AVE values (0.765 ~ 0.846) are higher than the inter-construct correlations. This illustrates that these constructs are different from one another thus supporting the model's relevance in measuring the AI driven culinary tourism experiences.

Table 5: Heterotrait-Monotrait (HTMT) criterion related to AI-Driven Experience Mediation Model in Culinary Tourism

	AIE	CIT	CMN	TBI	TSA
AIE					
CIT	0.641				
CMN	0.624	0.659			
TBI	0.611	0.663	0.632		
TSA	0.625	0.673	0.616	0.616	

The Heterotrait-Monotrait (HTMT) criterion to test the discriminant validity of the variables of the AI-Driven Experience Mediation Model in Culinary Tourism is presented in Table 5. HTMT values are the ratio of between construct correlations to within construct correlations, which allow judging whether constructs are distinct from each other. A generally accepted the HMT ratio threshold is said to be 0.85, but some researchers propose a more conservative cutoff of 0.90. All HTMT values shown in this table were lower than 0.85; hence, all values

had sufficient discriminant validity (except in Values), and each construct—AI-driven experience (AIE), culinary involvement in tourism (CIT), culinary motivation (CMN), tourist behavioural intention (TBI) and also tourist satisfaction (TSA) exhibited sufficient discriminant validity. This verifies that the constructs in the model do not correlate excessively and are thoughtfully measuring unique theoretical concepts in AI driven culinary tourism.

Table 6: R- Square and Overview of the AI-Driven Experience Mediation Model in Culinary Tourism

	R-square	R-square adjusted
AIE	0.738	0.737
TBI	0.848	0.847
TSA	0.811	0.808

The proportion of variance explained by the independent variables of this model is shown in the R-square and the Adj. R-square values of the AI-Driven Experience Mediation Model in Culinary Tourism, displayed in Table 6. The R square value of AI driven experience (AIE) is 0.738. Hence 73.8% of the variance in AIE i.e., experience, is explained by its predictors. This is the same as tourist behavioural intention (TBI) R-square which

equals 0.848, implying that 84.8% of the variance in the TBI model is explained by the independent variables. The satisfaction (R square = 0.811) shows that 81.1% variation in satisfaction can be explained by the influencing constructs. The high R-square values reflect that the AI-driven experience mediation model is an effective instrument for capturing the major relationships that impact the culinary tourism outcomes.

Table 7: Collinearity of Inner Model and f-square related to AI-Driven Experience Mediation Model in Culinary Tourism

	f-square	VIF
AIE -> TBI	0.513	2.468
AIE -> TSA	0.378	3.787
CIT -> AIE	0.519	4.166
CIT -> TBI	0.774	2.468
CMN -> AIE	0.548	4.166
CMN -> TSA	0.656	3.787

The collinearity statistics and effect size (f-square) on the strength and mediating effect size of the predictor variables on the dependent variables for the AI-Driven Experience Mediation Model in Culinary Tourism are presented in Table 7. Values of the f-square above 0.35 are indicative of a strong effect, 0.15 is a moderate effect, and 0.02 a weak effect. Effects are strong for relationships between culinary involvement (CIT) and AI driven experience (AIE) (0.519) as well as between culinary motivation (CMN) and AIE (0.548).

Moreover, CIT has a highly significant effect on tourist behavioural intention (0.774), so does CMN on tourist satisfaction (TSA) (0.656). The variance inflation factor (VIF) values, all less than the critical value of 5, which means that there is no collinearity concern that predictor variables do not have too much multicollinearity. The findings of this study generally confirm that the constructs of model significantly contribute to explaining tourist satisfaction and tourist behavioural intention toward AI driven culinary tourism experience.

Table 8: Collinearity of Outer Model related to AI-Driven Experience Mediation Model in Culinary Tourism

No	Variables	VIF	No.	Variables	VIF
1	AIE1	2.310	11	CMN3	2.541
2	AIE2	2.265	12	CMN4	2.889
3	AIE3	1.465	13	TBI1	2.541
4	AIE4	1.466	14	TBI2	1.879
5	CIT1	1.337	15	TBI3	1.257
6	CIT2	1.328	16	TBI4	1.157
7	CIT3	2.095	17	TSA1	1.223
8	CIT4	1.722	18	TSA2	1.584
9	CMN1	2.700	19	TSA3	1.386
10	CMN2	1.532	20	TSA4	1.034

The Variance Inflation Factor (VIF) diagnostic on the outer model of the AI-Driven Experience Mediation Model in Culinary Tourism is depicted through Table 8. The values of the VIF help to detect multicollinearity between indicator variables so that no strong linear dependence can be admitted or presumed. Usually, a value of VIF lower than 5 is considered acceptable collinearity. All VIF values in this table range from 1.034 to 2.889, therefore no collinearity is a problem in the model. Among all the indicators, indicators CMN4 (2.889) and CMN1 (2.700) have comparatively higher values of VIF, however, VIF values fall within an acceptable range of values. The collinearity of AIE indicators is from 1.465 to 2.310 and while TSI indicators have the lowest collinearity, from 1.034 to 1.584. These confirm that the collinearity criterion required of the measurement model is achieved, thus assuring the robustness and reliability of the construct indicators in explaining

the predictive power of the AI –driven culinary tourism experience.

Hypothetical Relationships in the AI-Driven Experience Mediation Model in Culinary Tourism

The purpose of the hypothetical relationships in the AI Driven Experience Mediation Model in Culinary Tourism is to examine the influence relationship of culinary motivation, culinary involvement, AI driven experiences, behavioural intention and tourist satisfaction. Based on this model, tourists' role on the culinary motivation and involvement is important in deciding the tourists' engagement in the AI driven experience and further reflected to their behavioural intentions and satisfaction. The research tests these hypotheses and in so doing provides more depth to understanding whether AI driven experiences can indeed improve culinary tourism.

Table 9: The Direct Hypothetical Relationship related to AI-Driven Experience Mediation Model in Culinary Tourism

Direct Relationships	Hypothetical	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
AIE -> TBI		0.334	0.513	0.108	3.093	0.000
AIE -> TSA		0.215	0.223	0.042	5.119	0.000
CIT -> AIE		0.675	0.679	0.148	4.561	0.000
CIT -> TBI		0.509	0.312	0.137	3.715	0.000
CMN -> AIE		0.784	0.786	0.157	4.994	0.000
CMN -> TSA		0.589	0.591	0.087	6.770	0.000

Table 9 presents the direct hypothetical relationships within the AI-Driven Experience Mediation Model in Culinary Tourism, showcasing the strength and significance of each path coefficient. The results indicate that AI-driven experiences (AIE) have a positive and significant impact on both tourists' behavioural intention (TBI) ($\beta = 0.334$, $p = 0.000$) and tourist satisfaction (TSA) ($\beta = 0.215$, $p = 0.000$), demonstrating the role of AI in enhancing culinary tourism experiences. Culinary involvement (CIT) significantly influences AI-driven experiences ($\beta = 0.675$, $p = 0.000$) and behavioural intention ($\beta =$

0.509 , $p = 0.000$), indicating that tourists engaged in culinary activities are more likely to interact with AI-driven platforms. Additionally, culinary motivation (CMN) strongly predicts AI-driven experiences ($\beta = 0.784$, $p = 0.000$) and tourist satisfaction ($\beta = 0.589$, $p = 0.000$), emphasizing that motivated tourists tend to explore AI-based solutions for an enhanced culinary journey. All relationships exhibit high statistical significance ($p < 0.001$), confirming the robustness of these direct effects in shaping the AI-integrated culinary tourism experience.

Table 10: Mediation Effect related to AI-Driven Experience Mediation Model in Culinary Tourism

Indirect Effect	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
CIT -> AIE -> TBI	0.225	0.227	0.034	6.631	0.000
CMN -> AIE -> TSA	0.169	0.172	0.039	4.322	0.000

The mediation effects of the Culinary Tourism AI-Driven Experience Mediation Model are presented in Table 10 with respect to indirect effects of culinary involvement (CIT) and culinary motivation (CMN) on tourist behavioural intention (TBI) and tourist satisfaction (TSA) through AI driven experience (AIE). The results also reveal that CIT significantly affects TBI indirectly through AIE ($\beta=0.225$, $p=0.00$), signifying that the characteristics of tourists who engaged in culinary activities will have higher TBI if AIE mediates their journey. Likewise, CMN has a positive impact on

TSA through AIE ($\beta = 0.169$, $p = 0.000$), signifying that more culinary motivated tourists will be more satisfied in case of augmentative intimacy of encounters by AI solutions. Mediation effects were high statistically significant ($p < 0.001$) affirming that AI driven experiences play a pivotal role in affecting the tourists' behavioural response and overall satisfaction, while bridging the tourists' culinary involvement, motivation and behavioural responses and overall satisfaction in culinary tourism.

Table 11: Types of Mediation existing in AI-Driven Experience Mediation Model in Culinary Tourism

Effect	Original sample	T statistics	P values	Mediation
Direct Effect (CMN $\rightarrow$ TSA)	0.589	6.770	0.000	Complementary Partial
Indirect Effect (CMN $\rightarrow$ AIE $\rightarrow$ TSA)	0.169	4.322	0.000	Mediation
Direct Effect (CIT $\rightarrow$ TBI)	0.509	3.715	0.000	Complementary Partial
Indirect Effect (CIT $\rightarrow$ AIE $\rightarrow$ TBI)	0.225	6.631	0.000	Mediation

As shown in Table 11, the AI Driven Experience Mediation Model of Culinary Tourism describes the types of mediation as direct and indirect effects. Both times the finding is complementary partial mediation; there are direct relationships between the independent and dependent variables, it's just that AI driven experience serves as a significant mediator to increase this relationship. More specifically, tourist satisfaction is positively affected by culinary motivation with a coefficient of 0.589 and a p-value of 0.000 and, through AI driven experiences, it has an indirect positive influence with a coefficient of 0.169 and a p-value of 0.000. This corroborates that tourists' satisfaction is the result of AI improved experiences alongside their intrinsic motivation. On the other hand, tourists' direct behavioural intention is also dependent on culinary involvement, with a coefficient of 0.509, p-value of 0.000, as well as indirect effect via AI driven experiences further determined through a coefficient of 0.225 and a p-value of 0.000. AI driven experiences increase the probabilities of tourists to partake in culinary activities, since this. These mediation effects oppose nicely, indicating the weight of AI inspired mediations in developing tourists' culinary experience, and satisfying them and their conduct.

Conclusion

The purpose of this study is to point out that AI driven experiences will act as major change agents

of culinary tourism in terms of motivations, involvement, satisfaction and behavioural intentions of tourists. The findings stress that the use of AI technologies is not only associated with a general tourist experience but they are indeed essential mediators of culinary motivation, involvement, and key tourism outcomes. Tourism businesses can create unique personalised recommendations using AI, immersive digital interactions and more efficient delivery of service to enrich and seamlessly deliver such culinary experiences to match changing traveller tastes and expectations. The study also stresses the importance of strategic adoption of the AI, collaboration from the industry as well as skilling of workforce to fully realize its potential in a credible and sustainable manner. As AI shapes the revolution of the tourism world, adoption of its capacities responsibly will usher in innovation, bolster destination competitiveness, and raise the next culinary travel experience towards an experience with ever stronger data base and cultural engagement.

AI driven experiences can provide several new opportunities for the culinary tourism where the tourists are well engaged and satisfied through these experiences. AI technologies like personalized recommendation system, augmented reality food experience, and AI chats bot can be used to leverage by tourism businesses to craft immersive, and personalized culinary journey.

Additional ways of developing strategic frameworks for AI adoption that still focus on an ethical approach and data privacy can also help build more consumer trust. Local food businesses and local AI developers can work together to create unique digital experiences that will keep the authenticity while bringing in the change that traveller's preference are changing. Training programmes and workshops to equip the hospitality professionals with the required skills help integration of AI tools in tourism services seamlessly. Finally, the study stresses on the increasing requirement of tourism stakeholders: policy makers, businesses and local communities to adopt AI-driven strategies as the tourists' preference evolves, facilitating more enriched and pleasurable travel experience. With the help of AI driven data analytics, destination marketers, restaurant owners, and tourism planners can gain insights about the tourist behaviour and satisfaction levels of people which in turn can help businesses to improvise and expand on their offerings as well as engage with the customer bases at large scale. The integration of AI with sustainable tourism practices would assist in reducing food waste, resources allocation and create eco-minded food experiences. AI enhanced techniques of storytelling, including interactive virtual food trails and personalized itinerary, can strengthen tourist's cultural bond and make their being in the destination more enjoyable. Through these strategic advancements, the maximum from AI in the culinary tourism can be enjoyed to further raise tourist satisfaction, business competitiveness, and a more sustainable and dynamic tourism ecosystem.

While the research makes significant contributions to understanding the mediating role of AI-based experiences in culinary tourism, a limited set of constraints need to be acknowledged. First, a cross-sectional research design was used, which only identifies tourist perceptions and behaviours at one particular point in time. This means that it does not allow for, for instance, a causal inference or the analysis of how motivations, participation, and satisfaction take form at different points in the tourist journey. Longitudinal studies would be useful in order to track changes over time and in order to lend support to claims of causality.

Secondly, the study was based on purposive sampling of 375 respondents in Kerala, India from

culinary destination. Although the sample size in PLS-SEM was statistically large, it is constrained by the geographical historicity that implies less generalizability of the findings in other cultural contexts, geographical regions, and countries. However, culinary motivations, technological acceptance, and AI engagement can vary greatly in other destinations with different culinary traditions and digital adoption levels.

Third, the research used self-reported survey data, which is subject to biases like social desirability or recall errors or exaggerated accounts of AI engagement. Furthermore, while scales were validated, perceptual constructs may not be sufficient to represent the complexity of experiential engagement with AI technologies in culinary environments.

Fourth, AI driven platforms cause several hazards beyond their benefits like displacement of chefs, lowering wages, fostering dependence on dominant platforms, privacy issues for data, cultural perceptions about being authentic, or the ethics involved in using AI. But these hazards due to AI lie outside the scope of this study. Combining these dimensions in future research could help to paint a more complete picture of AI-enabled tourism experiences

Finally, another limitation is the speed of technological innovation for Artificial Intelligence. While the findings are tied to the technologies and platforms popular at the time of data collection, new technologies (e.g., generative AI, immersive AR/VR dining) could continue to change the nature of tourists' expectations and behavioural patterns. Further research is needed to stay abreast of such developments and to establish the robustness of the proposed model in changing technological environments.

Abbreviations

AIE: AI driven Experiences, CIT: Culinary Involvement, CMN: Culinary Motivation, TBI: Tourists' Behavioural Intention, TSA: Tourists' Satisfaction.

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Author Contributions

Shine Paul: conceptualization, study designing, data collection, data analysis, interpreting the results, writing manuscript, drafting final manuscript, Shanmuganandavadivel J: conceptualization, study designing, data collection, data analysis, interpreting the results, writing manuscript, drafting final manuscript.

Conflict of Interest

The authors declare that they have no conflicts of interest related to the publication of this manuscript.

Declaration of Artificial Intelligence (AI) Assistance

Generative AI tools (Grammarly, ChatGPT) were used exclusively for grammar correction and language refinement. The authors confirm that no AI tool was used to generate, analyze, or interpret the research data or findings

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